Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte AKIHIRO IINO, MASAO KASUGA, and KENJI SUZUKI

Appeal No. 2002-0055
Application No. 09/290,046

ON BRIEF

Before HAIRSTON, KRASS, and BARRY, *Administrative Patent Judges*.
BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL

A patent examiner rejected claims 1-4, 6-14, 22-32, and 35-51. The appellants appeal therefrom under 35 U.S.C. § 134(a). We affirm-in-part.

BACKGROUND

The invention at issue on appeal is an ultrasonic motor. (Spec. at 1.) The ultrasonic motor includes a piezoelectric vibrating member 5, a polarized portion 7c of which detects the drive signal. Another polarized portion 7a of the member receives the drive signal and oscillates the member in self-excited oscillation to produce a drive force. The detecting portion is disposed at a position of the member that undergoes

maximum deformation. An amplifying circuit 13 amplifies the drive signal detected by the detecting portion and outputs the amplified signal to the driving portion to oscillate the member. (Appeal Br. at 3-4.)

A further understanding of the invention can be achieved by reading the following claim.

48. An ultrasonic motor comprising:

a piezoelectric vibrating member; and

a driving circuit for applying an exciting signal to the piezoelectric vibrating member to oscillate the piezoelectric vibrating member in self-excited oscillation, the driving circuit having a detecting electrode for detecting the exciting signal and disposed at a portion of the piezoelectric vibrating member for undergoing maximum deformation in at least one vibration mode of oscillation of the piezoelectric vibrating member, a driving electrode for receiving the exciting signal, and an amplifying circuit for amplifying the exciting signal detected by the detecting electrode and inputting the amplified signal to the driving electrode.

Claims 1-4 and 22-32, and 48-51 stand rejected under 35 U.S.C. § 103(a) as obvious over either U.S. Patent No. 5,198,714 ("Salomon") or U.S. Patent No. 5,001,404 ("Kataoka") in view of U.S. Patent No. 5,780,955 ("Iino"). Claims 6-14 and 33-47 stand rejected under § 103(a) as obvious over U.S. Patent No. 5,763,981 ("Okawazaki"); Iino; and either U.S. Patent No. 5,406,160 ("Shirasaki") or U.S. Patent No. 5,438,229 ("Ohtsuchi").

OPINION

Our opinion addresses the rejections in the following order:

- claims 1-4 and 22-32
- claims 48-51
- claims 6-14 and 33-47.

A. CLAIMS 1-4 AND 22-32

Rather than reiterate the positions of the examiner or the appellants *in toto*, we address the main point of contention therebetween. The examiner asserts, "Kataoka and Salomon teach a vibration motor using polarized piezoelectric material for drive and detection electrodes." (Examiner's Answer at 3.) He "note[s] Salomon (col 1 lines 35-38, col 2 lines 57-64), Iino (955) (col 1, 29-36) and Kataoka (col 1, line 63 - col 2 line 21." (Supp. Examiner's Answer at 3.) The appellants argue, "the specific teachings of Salomon and Kataoka identified by the Examiner do not disclose or suggest drive circuits having *a detecting polarized portion for detecting a drive signal having a drive frequency of the detecting polarized portion*. . . ." (Supp. Reply Br. at 6.)

In addressing the point of contention, the Board conducts a two-step analysis. First, we construe a claim to determine its scope. Second, we determine whether the construed claim would have been obvious.

1. Claim Construction

"Analysis begins with a key legal question -- *what* is the invention *claimed*?" *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). Here, independent claims 1 and 2 specify in pertinent part the following limitations: "a detecting polarized portion for detecting a drive signal having a drive frequency of the detecting polarized portion. . . ." Independent claim 3 includes similar limitations. Accordingly, the independent claims require detecting a drive signal having a drive frequency of a detecting polarized portion.

2. Obviousness Determination

Having determined what subject matter is being claimed, the next inquiry is whether the subject matter would have been obvious. "In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993) (citing *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992)). "'A *prima facie* case of obviousness is established when the teachings from the prior art itself would . . . have suggested the claimed subject matter to a person of ordinary skill in the art.'" *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)).

Here, one first sentence of Salomon cited by the examiner discloses that "information about the actual state of the stator-rotor system, particularly the frequency, amplitude and shape of the traveling wave, must be supplied to the control system." Col. 1, ll. 35-38. We find that the sentence teaches supplying the frequency, amplitude, and shape of a traveling wave to a control system. The other sentence of the reference cited by the examiner follows.

> A three-surface sensor may also be employed to advantage to detect slip between the vibrating stator and the rotor since due to the slip almost all natural frequencies of the vibrator are excited and a mixture of many frequencies results which is reflected at the sensor and can easily be detected by the evaluation circuit by means of simple filtering measures.

Col. 2, ll. 57-64. We find that the latter sentence teaches using a three-surface sensor to detect slip between a vibrating stator and a rotor based on natural frequencies of the vibrator that are excited. We are unpersuaded that either of the aforementioned teachings would have suggested detecting a drive signal having a drive frequency of a detecting polarized portion.

Turning to Kataoka, the paragraphs cited by the examiner follow.

> A driver circuit in a conventional vibration wave motor of this type is proposed in, e.g., Japanese Pat. Laid-Open (Kokai) No. 61-157276, U.S. Pat. No. 4,501,411, and Japanese Pat. Laid-Open (Kokai) No. 59-156169. One vibration detection piezoelectric element is fixed on the other one of the groups of piezoelectric elements (these elements are referred to as driving piezoelectric elements), and a frequency of the AC voltage applied to the driving piezoelectric elements is automatically

> changed into a resonance frequency in accordance with a detection output from the detection piezoelectric element, thereby improving efficiency of the vibration wave motor.
>
> In the vibration wave motor described above, however, the vibration detection piezoelectric element is fixed at the same spatial phase position as that of one of the groups of driving piezoelectric elements. More specifically, since the central point of the vibration detection piezoelectric element is located at a position offset from the central point of one area of the group of driving piezoelectric elements by a [sic] integer multiple of $\lambda/2$, thus posing the following problems.
>
> First, since the frequency characteristics of standing waves generated upon application of an AC voltage to the groups differ from each other due to the vibration detection piezoelectric element located at the same spatial phase position as that of one of the groups of driving piezoelectric elements, the vibration detection piezoelectric element can detect only a vibration state of the standing wave generated by applying the AC voltage to one group of driving piezoelectric elements.

Col. 1, l. 63 - col. 2, l. 21. We find that the paragraphs teach using a vibration detection piezoelectric element to detect a vibration state of a standing wave. We are unpersuaded that the teaching would have suggested detecting a drive signal having a drive frequency of a detecting polarized portion.

Turning to Iino, the paragraph cited by the examiner follows.

> Further, since the oscillation characteristics of the vibrating body change due to the change of the environmental temperature or the driving voltage, the drive must be carried out while detecting and controlling the drive parameters such as applied voltage, frequency, and phase to follow

> the change of the environment, by a current detector 705, a voltage detector 706, a control circuit 707, etc. Therefore, the driving circuit becomes complicated.

Col. 1, ll. 29-36. We find that the paragraph teaches using detectors to detect driving parameters such as applied voltage, frequency, and phase and using a control circuit to control the parameters. We are unpersuaded that the teaching would have suggested detecting a drive signal having a drive frequency of a detecting polarized portion. Therefore, we reverse the rejection of claim 1; of claims 22 and 23, which depend therefrom; of claim 2; of claims 24 and 25, which depend therefrom; of claim 3; and of claims 4 and 26-32, which depend therefrom.

B. CLAIMS 48-51

"[T]o assure separate review by the Board of individual claims within each group of claims subject to a common ground of rejection, an appellant's brief to the Board must contain a clear statement for each rejection: (a) asserting that the patentability of claims within the group of claims subject to this rejection do not stand or fall together, and (b) identifying which individual claim or claims within the group are separately patentable and the reasons why the examiner's rejection should not be sustained." *In re McDaniel*, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002 (citing 37 C.F.R. §1.192(c)(7) (2001)). "If the brief fails to meet either requirement, the Board is free to select a single claim from each group of claims subject to a common ground of

rejection as representative of all claims in that group and to decide the appeal of that rejection based solely on the selected representative claim." *Id.* at 1383, 63 USPQ2d at 1465.

Here, although the appellants allege that the claims are "separately patentable on their own merits," (Appeal Br. at 7), they fail to satisfy the second requirement. Rather than arguing the patentability of claims 49-51 separately, they assert, "[c]laims . . . 49-51 depend on and contain all of the limitations of independent claim[] . . . 48 and, therefore, distinguish from the references at least in the same manner. . . ." (*Id.* at 19.) Therefore, claims 49-51 stand or fall with representative claim 48. With this representation in mind, rather than reiterate the positions of the examiner or the appellants *in toto*, we address the following points of contention therebetween:

- signal being detected
- position of detector.

1. Signal being Detected

The examiner asserts, "Kataoka and Salomon teach a vibration motor using polarized piezoelectric material for drive and detection electrodes." (Examiner's Answer at 3.) He notes "Iino (955) (col 1, 29-36). . . ." (Supp. Examiner's Answer at 3.) The appellants argue, "the specific teachings of Salomon and Kataoka identified by the

Examiner do not disclose or suggest drive circuits having *a detecting polarized portion for detecting a drive signal having a drive frequency of the detecting polarized portion. . . .*" (Supp. Reply Br. at 6.)

a. Claim Construction

"[T]he Board must give claims their broadest reasonable construction. . . ." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1668 (Fed. Cir. 2000). "Moreover, limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993) (citing *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)).

Here, in contrast to claims 1-3, claim 48 specifies in pertinent part the following limitations: "a driving circuit for applying an exciting signal to the piezoelectric vibrating member to oscillate the piezoelectric vibrating member in self-excited oscillation, the driving circuit having a detecting electrode for detecting the exciting signal. . . ." Giving the representative claim its broadest, reasonable construction, the limitations require detecting an exciting signal applied to a piezoelectric vibrating member to oscillate the member.

b. Obviousness Determination

The question of obviousness is "based on underlying factual determinations including . . . what th[e] prior art teaches explicitly and inherently. . . ." *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697(Fed. Cir. 2001) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995)). Here, we find that Iino applies exciting voltage signals to a piezoelectric vibrating member to oscillate the member. Specifically, "in case of the conventional progressive wave type ultrasonic motor device, in order to rotate [a] moving body, two high frequency voltages different in phase from each other are applied to the piezo-electric element 704, so that the oscillation of the progressive wave needs to be generated on [a] vibrating body." Col. 1, ll. 20-25. We further find that the reference uses a voltage detector to detect the exciting voltage signal. To wit, "the drive must be carried out while detecting . . . the drive parameters such as applied voltage . . . by . . . a voltage detector 706. . . ." *Id.* at ll. 30-34.

2. Position of Detector

The examiner asserts, "Kataoka col. 3 In 55-68 . . . explicitly states in part '[a] central portion --- of the vibration detecting electrode --- is an anti node of the standing wave ---." (Examiner's Answer at 5.) He adds, "fig. 7 of Salomon . . . shows the center

of 57 and 56 located ½ from the center of drive electrodes 5 and 4 respectively. These locations are known anti-nodes." (*Id.*) The appellants argue, "none of these references teaches a detecting polarized portion disposed at a portion of the vibrating member or oscillating member which undergoes *maximum deformation in at least one vibration mode of oscillation* of the vibrating member or the oscillating member. . . ." (Appeal Br. at 13.)

a. Claim Construction

Claim 48 specifies in pertinent part the following limitations: "a detecting electrode . . . disposed at a portion of the piezoelectric vibrating member for undergoing maximum deformation in at least one vibration mode of oscillation of the piezoelectric vibrating member. . . ." Giving the representative claim its broadest, reasonable construction, the limitations further require that at least one detecting electrode be disposed at a portion of the piezoelectric vibrating member that undergoes maximum deformation in at least one vibration mode of oscillation.

b. Obviousness Determination

"'[T]he test [for obviousness] is what the combined teachings of the references would have suggested to those of ordinary skill in the art.'" *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1025, 226 USPQ 881, 886-87 (Fed. Cir. 1985) (quoting

In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)). Here, the appellants admit, "Kataoka and Salomon et al. disclose detecting electrodes disposed at an antinode of standing waves (Kataoka) and at an antinode of a travelling wave (Salomon et al.). . . ." (Supp. Reply Br. at 6.) For example, Figure 1A of Kataoka shows detecting electrodes S_A and S_B as respectively disposed at "position c-c' . . . an antinode of the A-phase standing wave and [at] position d-d' . . . an antinode of the B-phase standing wave." Col. 3, ll. 66-68. Because an antinode is "**a region of maximum amplitude** situated between adjacent nodes **in a vibrating body**," *Webster's Ninth New Collegiate Dictionary* 92 (1990) (emphasis added), we find that Kataoka or Salomon teaches disposing at least one detecting electrode at a portion of a piezoelectric vibrating member that undergoes maximum deformation in at least one vibration mode of oscillation. Therefore, we affirm the rejection of claim 48 and of claims 49-51, which fall therewith.

B. CLAIMS 6-14 AND 33-47

The examiner asserts, "[p]olarized piezoelectric material (including detection and drive portions) are explicitly refers [sic] to by," (Supp. Examiner's Answer at 2), "Shirasaki (at least col 3 lines 15-38) and Ohtsuchi chi (col 1 lines 56 68 [sic])." (*Id.*) The appellants argue, "Shirasaki and Ohtsuchi do not disclose or suggest a detecting

polarized portion for detecting a drive signal having a drive frequency of the detecting polarized portion, as recited in independent claim 6." (Reply Br. at 6.) They add, "[l]ikewise, Shirasaki and Ohtsuchi do not disclose or suggest a detecting electrode for detecting a drive signal having a drive frequency of the detecting electrode, as recited in independent claims 11 and 12." (*Id.* at 6-7.)

1. Claim Construction

Independent claim 6 specifies in pertinent part the following limitations: "a detecting polarized portion . . . for detecting a drive signal having a drive frequency of the detecting polarized portion. . . ." Similarly, independent claims 11 and 12 specify in pertinent part the following limitations: "a detecting electrode for detecting a drive signal having a drive frequency of the detecting electrode in accordance with vibration of the driving electrode. . . ." Accordingly, claims 6, 11, and 12 require detecting a drive signal having a drive frequency of a detecting polarized portion.

"Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim." 37 C.F.R. § 1.75. Here, claim 10 depends from independent claim 3. As aforementioned regarding claims 1-4 and 22-32, claim 3 requires detecting a drive signal having a drive frequency of a detecting polarized portion. Construing claim 10 to include the limitations of claim 3,

the dependent claim also requires detecting a drive signal having a drive frequency of a detecting polarized portion.

2. Obviousness Determination

The paragraphs of Shirasaki cited by the examiner teach in pertinent part that "vibration detection electrodes S_A and S_B are arranged to have substantially loop positions of standing waves generated by the A and B driving electrode groups as their centers." Col. 3, ll. 36-39. We find that the paragraphs teach arranging electrodes at loops of standing waves to detect vibration. We are unpersuaded that the teaching would have suggested detecting a drive signal having a drive frequency of a detecting polarized portion.

Turning to Ohtsuchi, the passage cited by the examiner follows.

> These electrodes are used to polarize the piezoelectric body 2, and portions of the piezoelectric body 2 corresponding to respective electrode members are polarized in the direction of the thickness thereof oppositely as indicated by the "+" and "-" signs in the figure.
>
> The electrode groups AA and BB and electrode CC on side 1 are positioned relative to the electrodes DD, EE, and FF on side 2. Specifically, if side 1 (FIG. 29) was turned over and placed against side 2 (FIG. 30), electrode group AA would be opposite electrode DD, electrode group BB opposite electrode EE, and electrode CC opposite electrode FF.

Col. 1, ll. 56-68. We find that the passage teaches arranging polarizing electrodes on a piezoelectric body. We are unpersuaded that the teaching would have suggested detecting a drive signal having a drive frequency of a detecting polarized portion.

As aforementioned regarding claims 1-4 and 22-32, we are unpersuaded that the paragraph of Iino cited by the examiner would have suggested detecting a drive signal having a drive frequency of a detecting polarized portion. The examiner fails to allege, let alone show, moreover, that the addition of Okawazaki cures the aforementioned deficiency of Shirasaki, Ohtsuchi, and Iino. Therefore, we reverse the rejection of claim 6; of claims 7-9 and 35-43, which depend therefrom; of claim 10; of claim 11; of claims 13, 44, and 45, which depend therefrom; of claim 12; and of claims 14, 46, and 47, which depend therefrom.

CONCLUSION

In summary, the rejections of claims 1-4, 6-14, and 22-47 under § 103(a) are reversed. The rejection of claims 48-51 under § 103(a), however, is affirmed. "Any arguments or authorities not included in the brief will be refused consideration by the Board of Patent Appeals and Interferences. . . ." 37 C.F.R. § 1.192(a)(2002). Accordingly, our affirmance is based only on the arguments made in the briefs. Any arguments or authorities not included therein are neither before us nor at issue but are

considered waived. No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

KENNETH W. HAIRSTON
Administrative Patent Judge

ERROL A. KRASS
Administrative Patent Judge

LANCE LEONARD BARRY
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